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IS 1605 (1977): Tapioca Starch, Cotton Textile Industry
[TXD 7: Textile Sizing and Finishing Materials]



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IS : 1605 - 1977
(Reaffirmed 1987)

Indian Standard

SPECIFICATION FOR
TAPIOCA STARCH, COTTON TEXTILE INDUSTRY

(*First Revision*)

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Indian Standard

SPECIFICATION FOR TAPIOCA STARCH, COTTON TEXTILE INDUSTRY

(*First Revision*)

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(*Continued on page 2*)

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IS : 1605 - 1977

(Continued from page 1)

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Indian Standard
SPECIFICATION FOR
TAPIOCA STARCH, COTTON TEXTILE INDUSTRY
(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 8 November 1977, after the draft finalized by the Textile Sizing and Finishing Materials Sectional Committee had been approved by the Textile Division Council.

0.2 While finalizing this standard, the Committee decided to prescribe the requirements of viscosity separately by using Redwood Viscometer and Brookfield Viscometer. Since the relation between the values of viscosity observed by using these two methods is yet to be established, the requirements prescribed in this respect are tentative only.

0.3 To familiarize the industry with International System of Units (SI Units), the basic SI Units as well as the recommended SI Units for use in the textile industry are given in Appendix A.

0.3.1 Standards of Weights and Measures Act, 1976 also stipulates the use of SI Units.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers tapioca starch used in (cotton) textile sizing and finishing.

*Rules for rounding off numerical values (revised).

2. REQUIREMENTS

2.1 Physical — The tapioca starch shall meet the following physical requirements:

Identification	To compare favourably with the photomicrograph given in Fig. 1
Particle size	To pass through 180 microns IS sieve
Cold water soluble	0.4 percent, <i>Max</i>
Viscosity at 75°C	44 seconds, <i>Min</i>

Method of Test, Ref to

IS : 4706-1968*

NOTE 1 — The requirements mentioned above in respect of viscosity are on tentative basis only.

NOTE 2 — The method for preparation of paste for viscosity determination shall be as follows when Redwood Viscometer is to be used:

Weigh 4.0 g of the dry material. Add this to a beaker containing 200 ml water, with continuous stirring. Weigh the beaker and the stirrer along with its contents. Keep the beaker in a boiling water-bath and cover with a plastic plate. Stir this with the paddle type mechanical stirrer at a speed of 45 to 50 rev/min. After one and a half hours weigh the contents along with the stirrer. Add sufficient water to compensate for the loss of water during cooking. Cook it for another 10 minutes and determine the viscosity of the paste at the required temperature using suitable viscometer.

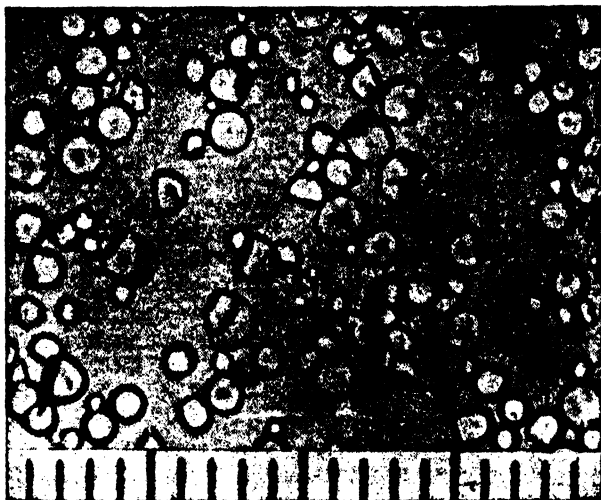


FIG. 1 PHOTOMICROGRAPH OF TAPIOCA STARCH ($\times 325$)
(Scale : 1 division = 10 microns)

*Methods of test for edible starches.

AMENDMENT NO. 1 JUNE 1980
TO
IS : 1605-1977 SPECIFICATION FOR
TAPIOCA STARCH, COTTON TEXTILE INDUSTRY
(First Revision)

Alterations

(*Page 4, clause 2.1, informal table, third column*) — Substitute
' IS : 4706 (Part I)-1978* ' for ' IS : 4706-1968* '.

(*Page 4, foot-note with '*' mark*) — Substitute the following for the
existing foot-note:

' *Methods of test for edible starches and starch products: Part I Physical methods
(*first revision*). '

(*Page 5, clause 2.2, informal table, third column*) — Substitute
' IS : 4706 (Part II)-1978* ' for ' IS : 4706-1968* '.

(*Page 5, foot-note with '*' mark*) — Substitute the following for the
existing foot-note:

' *Methods of test for edible starches and starch products: Part II Chemical
methods (*first revision*). '

AMENDMENT NO. 2 JULY 1983

TO

IS:1605-1977 SPECIFICATION FOR TAPIOCA STARCH
COTTON TEXTILE INDUSTRY

(First Revision)

[This amendment is mainly issued for the requirements of the viscosity which were given on tentative basis.]

Alterations

(Page 4, clause 2.1):

- a) *Informal table, second column, last line -*
Substitute '50 seconds, Min' for '44 seconds, Min'.
- b) *Note 1 - Delete.*
- c) *Note 2 - Substitute the following for the existing note:*

'Note - The method for preparation of paste for viscosity determination shall be as follows when Redwood Viscometer No. 1 is used.

Weigh 6.0 g of the dry material. Add this to a beaker containing 200 ml water, with continuous stirring. Weigh the beaker and the stirrer along with its contents. Keep the beaker in a boiling water-bath and cover with a plastic plate. Stir this with the paddle type mechanical stirrer at a speed of 45 to 50 rev/min. After one and a half hours weigh the contents along with the stirrer. Add sufficient water to compensate for the loss of water during cooking. Cook it for another 10 minutes and determine the viscosity of the paste.'

(TDC 12)

2.2 Chemical — The tapioca starch used as textile sizing and finishing material shall meet the following requirements also:

		<i>Method of Test, Ref to</i>
Moisture content	15.0 percent, <i>Max</i>	IS : 4706-1968*
Crude fibre	0.6 percent, <i>Max</i>	
Starch content	98 percent, <i>Min</i>	
Ash content	0.4 percent, <i>Max</i>	
Free acidity	25 ml, <i>Max</i>	
pH	4.5, <i>Min</i>	Appendix B
Petroleum hydrocarbon extractable matter	0.5 percent, <i>Max</i>	

2.3 If the original test specimens are analyzed as such in order to eliminate the time-consuming oven-drying, the observed mass should be corrected for moisture content while calculating the results.

3. PACKING

3.1 The tapioca starch (since hygroscopic in nature) should be packed in paper or polyethylene-lined jute bags. Bags preferably conforming to IS : 7406-1974†, IS : 8115-1976‡ or IS : 8117-1976§ may serve the purpose.

4. MARKING

4.1 Each package shall be marked with the name and net mass (kg) of the contents, name or trade-mark of the manufacturer, and date of packing.

4.1.1 The package may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1936 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

5. SAMPLING

5.1 Procedure for sampling of tapioca starch for carrying out tests given in 2.1 and 2.2 shall be as given in IS : 4662-1977|| unless otherwise specified in the contract.

*Methods of test for edible starches.

†Specification for laminated jute bags for packing fertilizers.

‡Specification for double hessian jute bags for pesticides.

§Specification for DW tarpaulin laminated jute bags for pesticides.

||Methods for sampling of starch and starch products (*first revision*).

5.2 Starch content and particle size shall be tested on individual samples and the remaining characteristics on composite samples.

5.3 Criteria for Conformity

5.3.1 Where the value specified is maximum, (mean + 0.5 range) shall not exceed the specified value.

5.3.2 Where the value specified is minimum, (mean - 0.5 range) shall not fall below the specified value.

APPENDIX A

(Clause 0.3)

SI UNITS

TABLE 1 INTERNATIONAL SYSTEM OF UNITS

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	CONVERSION
Force	newton	N	1 N = 0.101 972 kgf
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

TABLE 2 RECOMMENDED SI UNITS FOR TEXTILES

Sl No.	CHARACTERISTIC	SI UNIT		APPLICATION
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
1)	Length	Millimetre Millimetre, centimetre	mm mm, cm	Fibre Samples and test specimens (as appropriate)
		Metre	m	Yarns, ropes and cordages, fabrics
2)	Width	Millimetre Centimetre Millimetre, centimetre	mm cm mm, cm	Narrow fabrics Other fabrics Samples and test specimen (as appropriate)
		Centimetre, metre	cm, m	Carpets, druggets, durries (as appropriate)
3)	Thickness	Micrometre (micron) Millimetre	μ m mm	Delicate fabrics Other fabrics, carpets, felts
4)	Linear density	Tex Millitex Decitex	tex mtex dtex	Yarns Fibres Filament and filament yarns
		Kilotex	ktex	Slivers, ropes and cordages
5)	Diameter	Micrometre (micron) Millimetre	μ m mm	Fibres Yarns, ropes, cordages
6)	Circumference	Millimetre	mm	Ropes, cordages
7)	Threads in cloth:			Woven fabrics (as appropriate)
	a) Length	Number per centimetre	ends/cm	
		Number per decimetre	ends/dm	
	b) Width	Number per centimetre	picks/cm	
		Number per decimetre	picks/dm	
8)	Warp threads in loom	Number per centimetre	ends/cm	Reeds
9)	Stitches in cloth:			Knitted fabrics (as appropriate)
	a) Length	Number per centimetre	courses/cm	
		Number per decimetre	courses/dm	
	b) Width	Number per centimetre	wales/cm	
		Number per decimetre	wales/dm	
10)	Stitch length	Millimetre	mm	Knitted fabrics Made-up fabrics
11)	Mass per unit area	Grams per square metre	g/m ²	Fabrics

(Continued)

TABLE 2 RECOMMENDED SI UNITS FOR TEXTILES — *Contd*

Sl. No.	CHARACTERISTIC	SI UNIT		APPLICATION
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
12)	Mass per unit length	Grams per metre	g/m	Fabrics
13)	Twist	Turns per centimetre Turns per metre	turns/cm turns/m	Yarns, ropes (as appropriate)
14)	Test or gauge length	Millimetre, centimetre	mm, cm	Fibres, yarns and fabric specimens (as appropriate)
15)	Breaking load	Millinewton	mN	Fibres, delicate yarns (skeins or individual)
		Newton	N	Strong yarns (individual or skeins), ropes and cordages, fabrics
16)	Breaking length	Kilometre	km	Yarns
17)	Tenacity	Millinewton per tex	mN/tex	Fibres, yarns (individual or skeins)
18)	Twist factor or twist multiplier	Turns per centimetre $\times$ square root of tex Turns per metre $\times$ square root of tex	turns/cm $\times \sqrt{\text{tex}}$ turns/m $\times \sqrt{\text{tex}}$	Yarns (as appropriate)
19)	Bursting strength	Newton per square centimetre	N/cm ²	Fabrics
20)	Tear strength	Millinewton	mN	Fabrics (as appropriate)
		Newton	N	
21)	Pile height	Millimetre	mm	Carpets
22)	Pile density	Mass of pile yarn in grams per square metre per millimetre pile height	g/m ² /mm pile height	Pile carpet
23)	Elastic modulus	Millinewton per tex per unit deformation	mN/tex/unit deformation	Fibres, yarns, strands

APPENDIX B*(Clause 2.2)***ESTIMATION OF PETROLEUM HYDROCARBON
EXTRACTABLE MATTER****B-1. PROCEDURE**

B-1.1 Weigh accurately about 5 g of the test sample in a thimble and mix with 5 g of purified coarse sand previously extracted with petroleum hydrocarbon solvent (60 to 80°C bp). Place a piece of absorbent cotton in the top portion of the thimble to distribute the solvent as it drops on the sample. Transfer the thimble to the Soxhlet extractor. Take adequate quantity of petroleum hydrocarbon in a tared Soxhlet extraction flask and assemble the Soxhlet extraction apparatus. Heat on a water-bath or electric hot plate at such a rate that the solvent will drop from the condenser on the centre of the thimble at the rate of at least 150 drops per minute. Keep the volume of the solvent fairly constant by adding enough of petroleum hydrocarbon to make up for any loss due to evaporation. Continue extraction for 2 hours. Remove the thimble from the apparatus after the extraction and distill the excess of solvent leaving about 25 ml of the solution in the flask. Transfer the solution to a tared 100-ml beaker. Evaporate the solvent in the beaker on a steam-bath followed by heating in an oven maintained at $100 \pm 3^\circ\text{C}$ for 30 minutes. Dry the extract to a constant mass.

B-2. CALCULATION

B-2.1 Petroleum hydrocarbon extractable
matter, percent by mass (on oven-
dry mass basis) $= \frac{10\,000\,a}{b(100-M)}$

where

a = mass of the extract in grams;

b = mass of the sample taken in grams; and

M = moisture content, percent by mass of the sample.

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